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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
09 738,979	12 20 2000	Seiji Umemoto	Q62369	2654

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SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037

EXAMINER

RUDE, TIMOTHY L

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 04 10 2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/738,979

Applicant(s)

UMEMOTO ET AL.

Examiner

Timothy L Rude

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-10 and 12-14 is/are rejected.
- 7) ☐ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 includes the recitation "*portion shaped like a rectangle in section and having two or more optical path changing slopes*". This recitation is self-contradicting. Appropriate correction is required. For examination purposes, the recitation shall be interpreted as -- portion shaped *substantially* like a *trapezoid* in section and having two or more optical path changing slopes --.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United

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States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Yuuki et al (Yuuki) USPAT 6,147,725.

As to claim 1, Yuuki discloses in Figures 2, 3, and 4 (col. 5, line 19 through col. 8, line 52, especially col. 5, lines 45-55) a liquid-crystal display (LCD) device comprising: a transmission type liquid-crystal display panel, 21, including a liquid-crystal cell; a light source, 13, disposed on at least one side surface of said liquid-crystal display panel; and a light guide plate, 11, (Applicant's optical path changing sheet) disposed on a back side opposite to a visual side of said liquid-crystal display panel and having optical path changing slopes, 50a through 50f, by which incident light from said light source is reflected toward said visual side of said liquid-crystal display device (ray traces b and f).

Fig.3

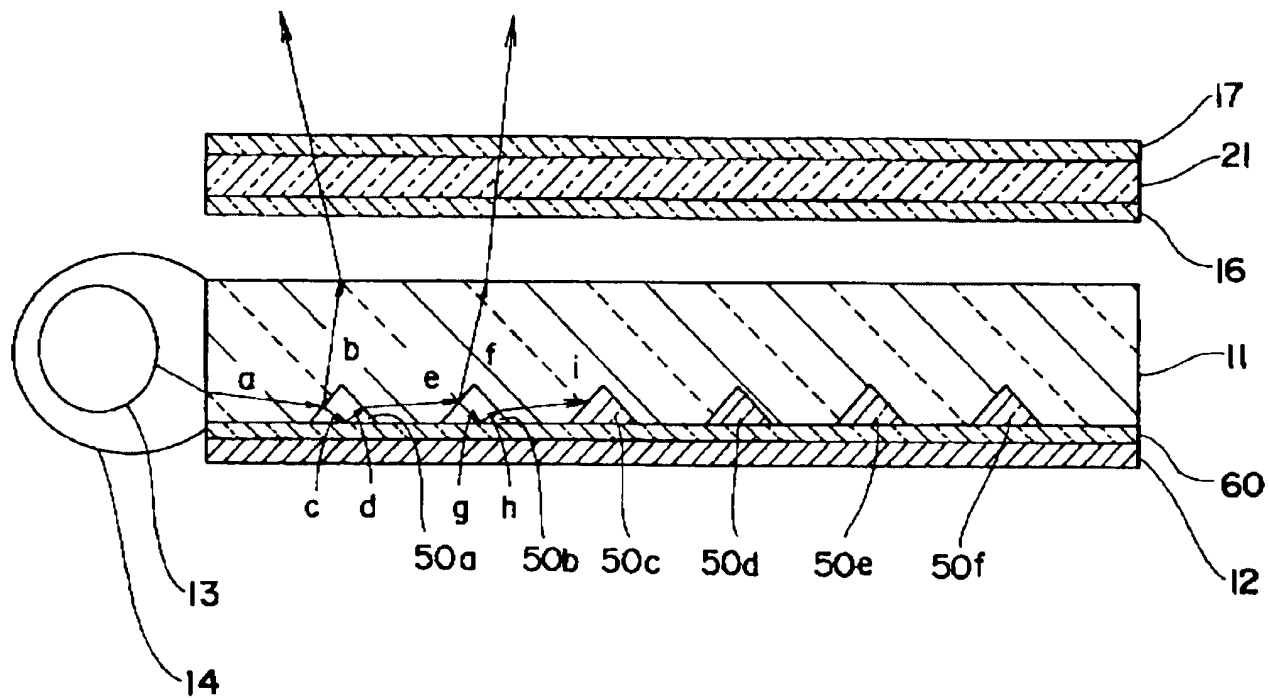
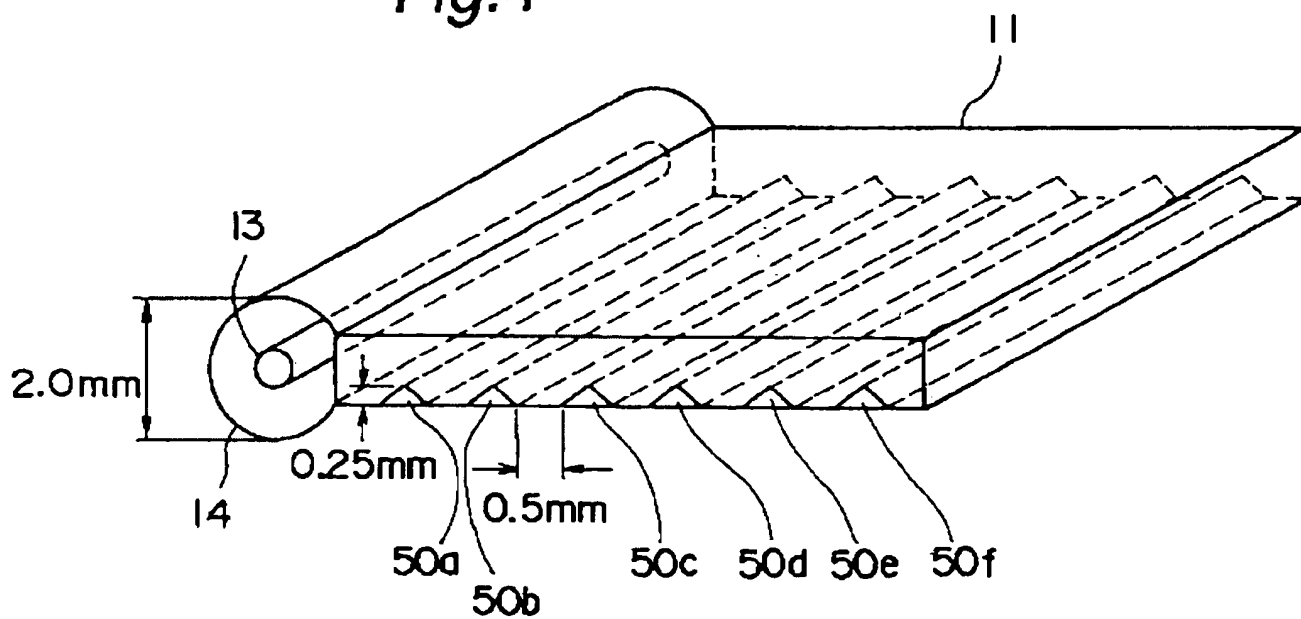


Fig.4



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As to claim 2, Yuuki discloses in Figures 2, 3, and 4 (col. 5, line 19 through col. 8, line 52, especially col. 5, lines 19-22) the liquid-crystal display device according to claim 1, wherein said liquid-crystal display panel further includes a polarizer, 16, disposed on one or each, 17, side of said liquid-crystal cell, 21.

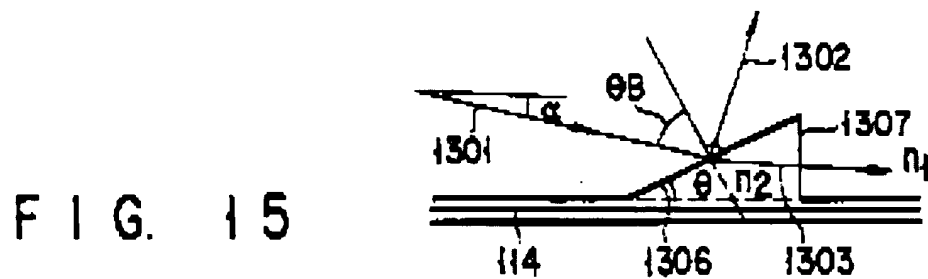
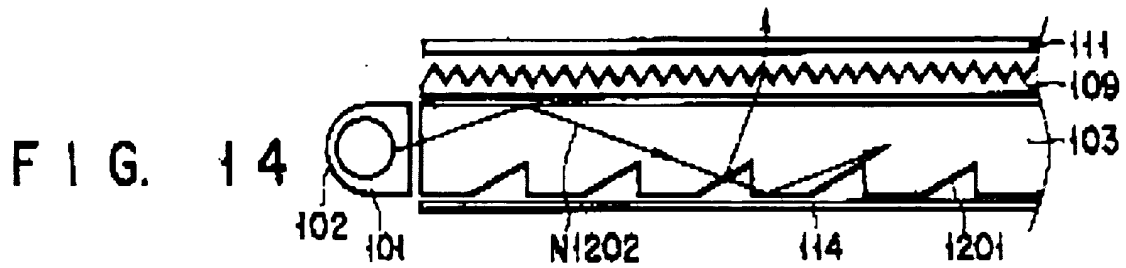
3. A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Taira et al (Taira) USPAT 5,712,694.

As to claim 1, Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 13, lines 60-67) a liquid-crystal display device (Title and Abstract) comprising: a transmission type liquid-crystal display panel including a liquid-crystal cell; a light source, 101, disposed on at least one side surface of said liquid-crystal display panel; and a light-guiding plate, 103, (Applicant's optical path changing sheet) disposed on a back side opposite to a visual side of said liquid-crystal display panel and having optical path changing slopes, 1201, by which incident light from said light source is reflected toward said visual side of said liquid-crystal display device (ray trace 1302).

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As to claim 13, Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, line 65 through col. 15, line 2 and col. 8, lines 34-41) the liquid-crystal display device according to claim 1, further comprising a reflection layer, 114, disposed on a back side opposite to a visual side of said optical path changing sheet.

As to claim 14, Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, line 65 through col. 15, line 2 and col. 8, lines 4-13) the liquid-crystal display device according to claim 13, wherein said reflection layer adheres (col. 8, lines 34-37) closely to a surface of said optical path changing sheet on which said optical path changing slopes are formed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taira, as applied to claim 1 above.

As to claims 7 and 8, Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, lines 43-64) the liquid-crystal display device according to claim 1, wherein said optical path changing sheet includes repetitive prismatic structures having optical path changing slopes facing said light source at an inclination angle, θ , of from 3 to 56 degrees (includes Applicant's 35 to 48 degrees of claim 7 and includes Applicant's 38 to 45 degrees of claim 8) with respect to said sheet plane.

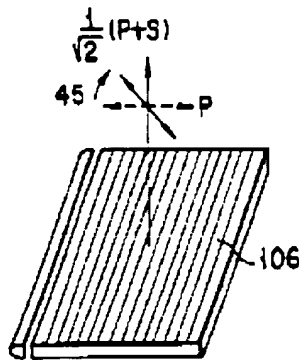
Taira is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add an inclination angle of from 35 to 48 degrees or from 38 to 45 degrees to reflect light at Brewster's angle (col. 14, lines 43-54) towards the LCD and the viewer.

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Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the optical path changing sheet with the inclination angles of Taira.

As to claim 9, Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, lines 43-64) the liquid-crystal display device according to claim 7, wherein each of said prismatic structures of said optical path changing sheet is constituted by a concave portion shaped like a saw-tooth (Applicant's triangle in section) (col. 13, lines 51-54).

As to claim 10, Taira discloses in Figures 5B, 14, and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, line 65 through col. 15, line 2) the liquid-crystal display device according to claim 9, wherein said prismatic concave portions are constituted by continuous grooves extended from one end of said sheet to the other end of said sheet in a ridgeline direction parallel to or inclined to a side surface of said liquid-crystal display panel on which said light source is disposed.



F I G. 5 B

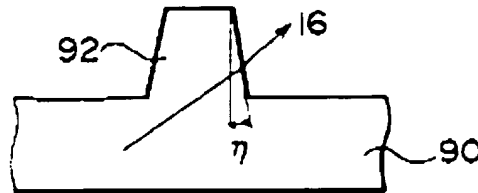
5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taira, as applied to claims 1 and 7 above, in view of Miyashita et al (Miyashita) USPAT 6,011,602.

As to claim 12, Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, lines 43-64) the A liquid-crystal display device according to claim 7, wherein each of said prismatic structures of said optical path changing sheet is constituted by a concave portion and having two or more optical path changing slopes facing said light source.

Taira does not explicitly disclose convex prismatic structures shaped substantially like a trapezoid (Applicant's, like a rectangle) in section.

Miyashita teaches in Figure 10A the use of convex prismatic structures shaped substantially like a trapezoid in section to make manufacture by injection molding easier (col. 15, lines 58-67).

FIG. 10A



Miyashita is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use convex prismatic structures shaped substantially like a trapezoid in section to make manufacture by injection molding easier.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the optical path changing sheet of Taira with the convex prismatic structures shaped substantially like a trapezoid in section of Miyashita.

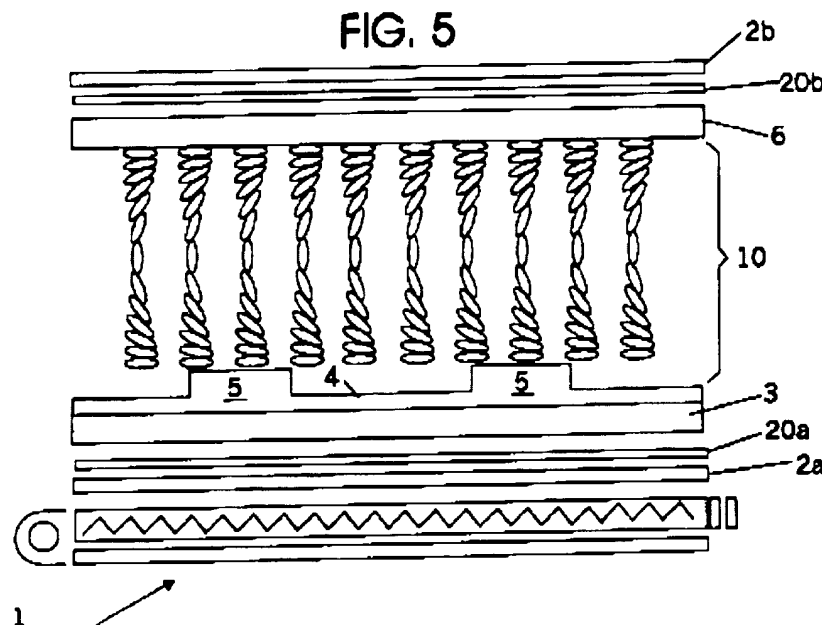
6. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuuki, as applied to claims 1 and 2 above, in view of Nakamura, USPAT 6,137,554.

As to claim 3, Yuuki discloses in Figures 2, 3, and 4 (col. 5, line 19 through col. 8, line 52, especially col. 5, lines 19-22) the liquid-crystal display device according to claim 2.

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Yuuki does not explicitly disclose at least one retarder disposed between said liquid-crystal cell and said polarizer.

Nakamura teaches in Figure 5 a back lighted transmission type LCD with at least one phase difference compensation layers, 20a and 20b (Applicant's, retarder) (col. 5, lines 20-34) disposed between said liquid-crystal cell, 10, and said polarizer, 2a and 2b.



Nakamura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use at least one retarder disposed between said liquid-crystal cell and said polarizer to compensate for the birefringence of the liquid crystal layer.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Taira with the retarders of Nakamura.

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As to claim 4, Yuuki discloses in Figures 2, 3, and 4 (col. 5, line 19 through col. 8, line 52, especially col. 5, lines 19-22) the liquid-crystal display device according to claim 1.

Yuuki does not explicitly disclose cell substrates for supporting said liquid-crystal cell, said cell substrates being made of an optically isotropic material.

Nakamura teaches in Figure 5 a back lighted transmission type LCD with substrates, 3 and 6, made of glass (Applicant's optically isotropic material) (col. 5, lines 24 and 25) to hold the liquid crystal material.

Nakamura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use substrates made of glass (Applicant's optically isotropic material) to hold the liquid crystal material.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Taira with the glass substrates of Nakamura.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuuki in view of Nakamura as applied to claim 4, and further in view of Taira.

As to claim 5, Yuuki in view of Nakamura discloses the liquid-crystal display device according to claim 4 comprising an optical path changing sheet with the

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slope-forming surface of said optical path changing sheet located on said back side opposite to said visual side of said liquid-crystal display panel.

Yuuki in view of Nakamura does not explicitly disclose an adhesive bonded LCD.

Yuuki in view of Nakamura does not explicitly disclose an optical path changing sheet having optical path changing slopes each inclined at an inclination angle in a range of from 35 to 48 degrees with respect to a sheet plane, and a refractive index difference not larger than 0.15 between said optical path changing sheet and one of said cell substrates nearest to said optical path changing sheet.

Taira discloses an LCD device wherein a reflection layer adheres (col. 8, lines 34-37) closely to a surface of said optical path changing sheet on which said optical path changing slopes are formed.

Taira discloses in Figures 14 and 15 (embodiment 11, col. 13, line 50 through col. 15, line 16, especially col. 14, lines 43-64) an optical path changing sheet with an index of refraction of 1.5 that includes repetitive prismatic structures having optical path changing slopes facing said light source at an inclination angle, θ , of from 3 to 56 degrees (includes Applicant's 35 to 48 degrees) with respect to said sheet plane. Note: typical LCD glass substrates have an index of refraction well within a range of 1.4 to 1.6, inherent property of suitable substrate glasses, e.g., SiO_2 has a refractive index of 1.44968.

Taira is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add an inclination angle of from 35 to 48 degrees to reflect light at Brewster's angle (col. 14, lines 43-54) towards the LCD and the viewer.

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Taira is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to provide a difference in refractive index not larger than 0.15 between said optical path changing sheet and one of said cell substrates nearest to said optical path changing sheet to make use of generally available suitable materials, e.g., glass, and reduce unwanted scattering of the light and improve polarization efficiency (col. 12, lines 25-32).

Taira is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to adhesive bond the layers of the assembly to prevent unwanted scattering of the light and improve polarization efficiency (col. 12, lines 25-32).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD device of Yuuki in view of Nakamura with the adhesive bonded optical path changing sheet with prism inclination angles of from 35 to 48 degrees and a refractive index difference not larger than 0.10 (Applicant's, 0.15) between said optical path changing sheet and one of said cell substrates nearest to said optical path changing sheet of Taira.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuuki in view of Nakamura and Taira as applied to claim 5, and further in view of Koike USPAT 6,322,225.

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As to claim 6, Yuuki in view of Nakamura and Taira discloses the liquid-crystal display device according to claim 5, wherein the refractive index difference is not larger than 0.10 between said optical path changing sheet and one of said cell substrates nearest to said optical path changing sheet.

Yuuki in view of Nakamura and Taira does not explicitly disclose a refractive index difference that is not larger than 0.15 between said adhesive layer and said nearest liquid-crystal cell substrate.

Koike teaches (col. 15, lines 12-20) the use of an adhesive that has a refractive index that is as much as possible the same as that of the light scattering guide (and therefore the liquid crystal substrates also) to prevent generation of brightness irregularity with coloring phenomenon or stripe shape due to optical interference phenomenon.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD device of Yuuki in view of Nakamura and Taira with the adhesive bonded optical path changing sheet with a refractive index as much as possible the same as (Applicant's, difference not larger than 0.15) the nearest liquid-crystal cell substrate of Koike.

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Allowable Subject Matter

9. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 11, a search of relevant prior art did not disclose, alone or in combination, the liquid-crystal display device according to claim 7, wherein said prismatic concave portions are constituted by discontinuous grooves each of which has *a length of not smaller than five times as large as the depth* of said groove and in which a direction of a length of said groove is substantially parallel to a side surface of said liquid-crystal display panel on which said light source is disposed.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William L Sikes can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

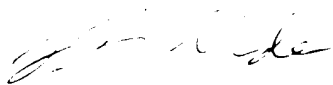
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308-7724 for regular communications and (703) 308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.



Timothy L Rude
Examiner
Art Unit 2871

TLR
April 3, 2002



TOANTON
PRIMARY EXAMINER